ENGINEER & INVENTOR.

An Illustrated Monthly Journal.

VOL. 1. No. 1. *TORONTO, APRIL, 1893.* $1.00 A YEAR.

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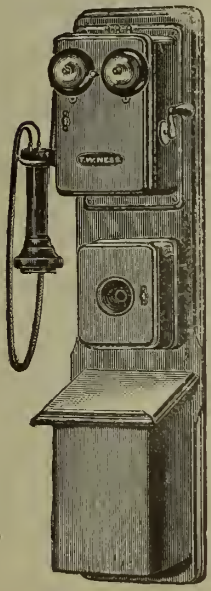

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An Illustrated Monthly Journal.

VOL. 1. NO. 1. TORONTO, APRIL, 1893. $1.00 A YEAR.

DEVELOPMENT IN STEEL MAKING.

The London *Times* gives a long account of a number of experiments lately made with a new description of steel, the success of which appears to point to a revolution in the steel trade. An important advance in the manufacture of what is technically known as tool steel, it says, has recently been developed into practical shape in England. It is a new process, the invention of Mr. Francis G. Bates, of Philadelphia, which has been under trial in this country for the past twelve months on a working scale. It consists in converting a low-grade steel by a remarkable economical process into a high-class steel, suitable for making turning tools for iron and steel, punches, chisels and similar articles.

The system is carried out by placing bars of Bessemer or other steel, containing a low percentage of carbon, in a specially designed furnace and subjecting them to a high temperature. The steel to be converted is embedded in a carbonaceous compound of special character, and placed in a chamber in a furnace, which has three fire grates, with flues and passages so constructed that a surprising economy of fuel is secured by reason of the perfect character of the combustion. So complete is the combustion that there is no escape of any visible products in the form of smoke after the furnace has been started, and although a very high temperature is maintained, equal to melting cast iron, the temperature of the escaping gases is remarkably low, so thoroughly is every atom of heat utilized.

Many tons of steel have been so converted and a number of tools have been made from it. In all cases the tools thus made have turned out exceedingly well, some of them doing work comparable with Mushet steel, which is the most costly steel made. Various brands of low-grade steel, including Bessemer, Glengarnock, basic, Brown, Bayley and Brymbo steel, costing on the average £7 per ton, have been tried. From these bars, when converted, turning tools, punches and chisels were made and successfully tested in actual work. The process is, in fact, a commercial success, and constitutes a new departure in the manufacture of high-class steel from steel of a low grade.

Many well-known users of steel have, after due trial, certified to its value, and have expressed their readiness to adopt it. Should the apparently reasonable expectations entertained, respecting this steel be realized, a revolution in the steel trade should practically result. Moreover, by the Bates system, not only can steel be successfully treated, but wrought and cast iron can be converted. Its application, in fact, appears to be very far reaching and capable of meeting the requirements of war as well as those of peace.

A NEW ENGLISH INSTITUTION.

It is now officially announced that the labor department of the board of trade is to be reorganized, and that the government has sanctioned the requisite expenditure. The early publication of the facts in connection with it was regarded as a breach of confidence on the part of some one who was consulted, as was also the fact that certain persons have been approached on the subject of the various appointments. However, Mr. Mundella has now announced: The new labor department will be under the board of trade, but it will be as distinct as that of the railways from the mercantile marine. There will be a Commissioner for Labor, with four labor correspondents, each of the latter having his own special work.

There will also be, it appears, a number of labor correspondents in the chief centres of industry, whose duty it will be to furnish information from time to time or regularly, as the case may be. The latter will not be "officials," but will have a small yearly honorarium for the special work performed. It will be their duty to supply reports on the state of trade, on matters of dispute and other subjects. In the event of special inquiries being required, the labor department will send down an "official" or other person specially qualified. A Labor Gazette will be established for the purpose of publishing and disseminating the information collected, but quite distinct from the Board of Trade Journal. Morover, it is intended that the invaluable mass of information hidden away in Blue Books, consular and other reports, shall be popularized and presented in an available and readable form.

In this way it is hoped that the labor department will fulfil its mission as a department for the collection, tabulation and publication of information on all subjects of industrial interest, not merely historically, as in the United States, but periodically, throughout the year. The department will not be executive in any way, but its advice will be sought by the responsible minister upon matters pertaining to labor. There will, however, still be the divided duties and responsibilities as regards factories and work shops and mines under the home office, and so to registration by the registrar of friendly societies.—*London Engineering.*

A Brockton manufacturer began shoe-making twenty-five years ago with a capital of three hundred dollars. At the expiration of the first year he had lost that sum and was six hundred dollars in debt. Not discouraged, he incurred additional obligations and continued business. When the second year ended he had made five thousand dollars. Since then he has been uniformly prosperous.

LOCATING TOOLS IN A SHOP.

No more important question confronts the manager of a shop than that of properly arranging his tools, to so place each machine as to permit it to be worked continuously and to its full capacity, and to require a minimum expenditure of time and labor. The solution becomes simple when work of the same character is done month in and month out; then the tools can be so placed that the work is, under no circumstances, compelled to retrace its steps, but moves constantly from the pattern shop toward the shipping-room. But the problem becomes exceedingly difficult when the work passing through the shop varies frequently, and when the necessary machine work differs with each piece. This happens in every large establishment, and is particularly the case in shops building tools to order or from special designs.

Grouping all the tools of the same kind— lathes, planers, milling machines and so on—together, is, in the majority of cases, a poor plan, since about the only thing that can be said in its favor is that it presents a neat appearance. The only way to consider the question is to think of each tool solely as a device for doing work, and to so place it that it can always be run to its full capacity. In most cases the nature of the work requires the employment of different tools, and if they are placed far apart the cost of production is increased by the expense of extra handling.

It is evident that work done in each individual shop must control the placing of its machines. No two plants are alike, any more than their productions are alike. Therefore the manager of one establishment can derive benefit from the study of another only from the hints he may receive as to the better disposition of his own tools for doing his particular work. It would not be to his best interest to copy exactly any other concern.

A suggestion of the advantages to be derived by the placing of tools where they can be operated best is to be found in the following extracts from a recent paper by W. S. Rogers, read before the New York Railroad Club:

Taking, for example, the work on cylinders, planing, boring and drilling are the three distinct operations to be performed. If the planer is located near the boring lathe, and in proper position, and the radial drill is also within convenient range, very little transient labor will be required to perform the three operations. We also will find that the man on the boring tool can push along the planing and oversee the drilling, thus keeping all the machines in operation with the minimum of labor, and in equally rapid time as if it were done the old way, with one man to each machine, and one-third of them waiting for work to reach them, as would be the case if they were isolated.

The important gains made by such methods are almost wholly in time, and if nothing else is earned this alone is money saved. If a piece of work (a set of guides for example, of four driving-boxes) can be finished in six hours, it is the height of false economy to allow the time to be lengthened out an hour or two longer because the labor element is too busy elsewhere to take it from the machine. Far better will it be to move the machine to a more convenient location.

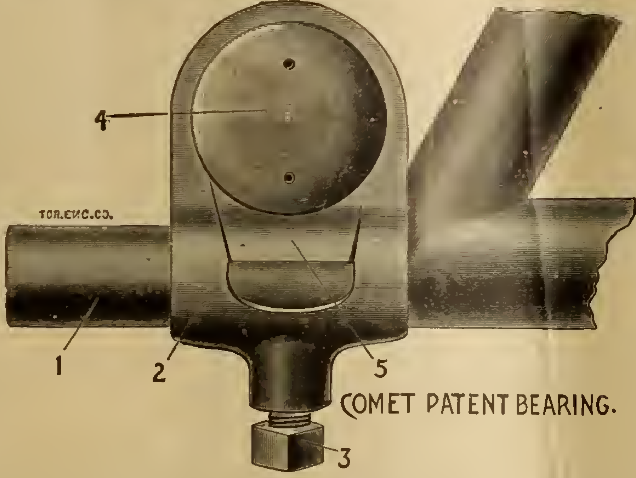
Following the work on the various machines closely, and having them so placed in position with reference to the travels of the many parts of work through the shop towards finish and erection, thus avoiding all back-lash, confusion, delays and clashing among employes, means low cost of production, harmony throughout the plant, fewer names on the payroll, and large decrease in operating expenses, with increased amount of work performed every year. We have in mind one shop doing large work which established a sort of "emergency" department. In this were put a large planer, boring mill, lathe, drill and slotter. These are placed in one and of the assembling-room. It was the intention to do such large work of a special character as could not be carried on conveniently on the regular tools in the other departments. But it was soon found that the best way was to send all large castings direct from the foundry to this group of tools and there finish them. The consequence is that this department, instead of being idle a part of the time, as it was at first thought it would be, is crowded with work. The result is a lessening of the cost of doing the work, due primarily to the feet that several tools of different kinds are placed near together.—*Iron Age.*

A STEAM WAGGON.

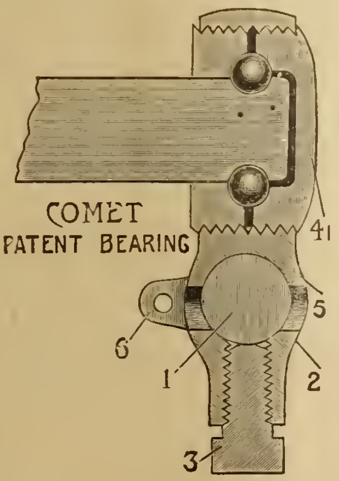
A remarkable specimen of mechanical ingenuity has recently been shown by a machinist of Baltimore. It is in the form of a unique wagon, which is propelled by means of a Van Dusen ten horse power gasoline engine. The proposed wagon, which is completed and has had one trip, and is now undergoing some alterations in the axle bearings, is about 16 feet in length, weighs about 6,000 pounds, and is quite long enough to seat twenty persons comfortably. The engine, as designed and applied, is small and compact, resting beneath the floor and between the axles, and concealed by steps mounting to the body of the vehicle. One side of the engine is furnished with a metallic fly wheel of forty-eight inches diameter, at right angles to which revolves a friction wheel, the circumferance of which is leather. The smaller wheel is turned by the revolution of the fly wheel. Upon the same axle is another small wheel, which causes to revolve a metal disk, and to the latter is attached a link chain, which likewise surrounds the rear hub. The power is thus transmitted from the fly wheel to the friction wheel and thence to the hub. The speed can be increased or diminished by widening or lessening the distance of the friction wheel from the centre of the fly wheel, the former being ten inches in circumference, the latter forty-eight inches. A speed of from three to twenty miles is guaranteed at a cost of one cent per hour for the engine power and ten cents per gallon for the gasoline. A tank of thirty gallons capacity will be placed in the wagon, but ten gallons per day will probably be an ample allowance. The levers necessary for the propagating, lessening and increasing the motion will be a brake, a speed lever and a steering apparatus, and the driver or steerer will be placed in the front part of the wagon, conveniently near all these. Should the wagon fulfil the predictions of the inventor, horse power as a means of street locomotion may be in a great maasure done away with.

AXLE BEARING.

In the accompanying sketch is shown an illustration of a self-righting axle bearing designed, patented, and manufactured by the Comet Cycle Co., of Toronto, and is adapted more particularly for bicycles and like vehicles. The bearing consists of a bearing case and a collar formed integral with the bearing case. The bearing case is reamed out to form an opening to receive the adjusting cones, 4, provided with the surfaces for the bearing balls. The collar, 2, is fitted to receive the shank, 1, of the vehicle, and the collar is securely held in place by means of a set screw, 3. By reference to the sketch it will be noticed that the bottom seat, 5, of the bearing case is movable on account of being cut entirely through the bearing case and partially through at the other side from the opening in the collar. This construction admits of the bottom seat of the bearing case serving as a lock to prevent the unscrewing of the adjusting cones within the bearing case. The bottom seat of the bearing case is crowded against the thread at the under side of the adjusting cones by means of the pressure of the set screw, 3. The advantages of an axle bearing of this description is that in the event of a twist or bend to the frame of the bicycle the set screw, 3, can be loosened and the axle bearing instantaneously righted, thus relieving the axle from binding on the bearings.



COMET PATENT BEARING.



COMET PATENT BEARING

SELF-HARDENING STEEL.

There is little doubt but that there is considerable misunderstanding among machinists regarding the use of self-hardening steel. It is quite common to resort to this steel where the ordinary carbon steel used in the shop does not stand well, or refuses to cut; then if the self-hardening steel does not work it is considered that every resource has been exhausted. The fact is, however, that while it is true that self-hardening steel will often do good work where the ordinary steel fails, or is unsatisfactory, carbon steel of high grade and high carbon can be and is made and hardened in the usual way, that will readily cut metals that no self-hardening steel can make an impression upon.

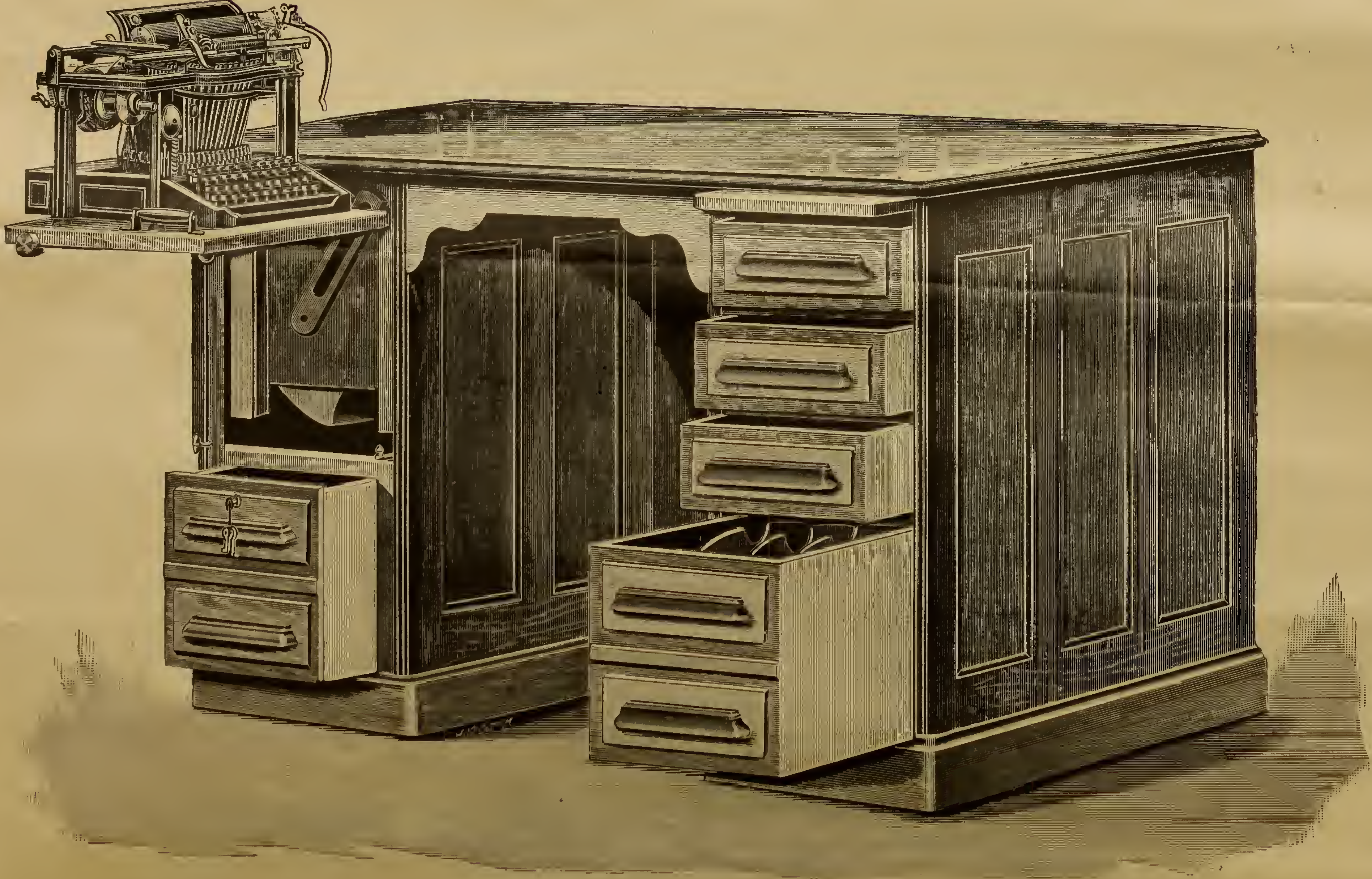
It is said a number of coarse files or rasps have been piled upon each other to a height of 12 inches, bound together with wire and drilled through from top to bottom of the pile without lubricant. This was not done by a drill made of self-hardening steel, nor of such common steel as is too often supplied by purchasing agents who give far more attention to discounts and commissions than to quality of steel they buy, but by a high-grade carbon steel made especially for use in such a test.

Mushet or self-hardening steel is all right in its place, but there are places for which it is not adapted, and it is best, both for makers and users, that the proper place and uses of the different kinds of steel should be understood.

HEATED JOURNALS.

Engineers are quite interested in a device lately brought forward for sounding an alarm whenever a bearing gets hot. The arrangement consists of a cup containing some mercury, this cup being set in the bearing, and wires are connected from the cup to a bell and annunciator, one of the wires leading from a screw that can be set at any desired distance from the surface of the mercury; this screw is screwed down until it touches the mercury, and the circuit completed through the mercury, causing the bell to ring, and the screw is then backed any distance required. Should the bearing become heated, the mercury expands, closing the circuit when it touches the screw, and thus giving the alarm. It is proposed to have one on each bearing, the belief being expressed that, though this would lead to a multiplicity of numbers, and probably some confusion at times, no doubt can be entertained that it would save fires very often in such places as saw-mills: also in some portions of cotton mills, where dust is likely to get into a bearing and cause it to heat, this arrangement, it is thought, may serve a useful purpose.

The British war-ship Hercules has completed her steam trials off Portsmouth, England. Ever since this ship was re-engined with modern machinery she has given trouble. This trouble has arisen principally through the excessive noise and vibration produced by the propellers at all rates of speed; subsequently two blades were removed, and the remainder reduced in diameter. The clearance thus effected served to reduce the disturbance, but not entirely, and it was afterward experimentally decided to push the propeller about eight inches further to the rear, and to give the blades an outward twist, so as to throw the wash away from the ship's counter. The results obtained were so satisfactory that a four-bladed propeller of similar contour will be fitted.



THE PATENTED VETTER TYPE'RITER DESK.

THE PATENTED VETTER TYPEWRITER DESKS.

The typewriter, as shown in the cut, is independent from the desk or writing table, and papers and books will not have to be removed when the typewriter is wanted for use.

To use the typewriter in any position desired, we have adopted a turn-table on the board or platform which holds the machine, so that it may be turned more to the left or clear to the end of the desk. To replace the typewriter in its vault, a tip with one finger to the upper end of the arm, with the slot therein, which holds the platform in its position, will let the machine downward in a cushion-like manner, to lean against the inside of left end of desk. It may then be pushed backwards as far as it goes with a push of the left hand, as it runs very easy on a track and on wheels; the door which leans against the extreme end of the desk, swinging on pin hinges, will shut off the compartment with the machine, and locks with a good flat key lock.

When the typewriter is wanted for use, unlock the door, swing it back to the end of the desk, pull out the typewriter by the handle (seen near the edge of the platform) as far as it goes. The machine with platform will then lift itself upward, by means of the counter-balance weight, and catch into a notch on the catch arm, to make it stationary and ready for use. The cut in outline, shows the typewriter in a position ready to be used.

In placing before the business public this line of typewriter desks, we beg to state that they are made exactly like all our goods—first-class in every respect—and should not be compared with others in the market. We guarantee every desk to be satisfactory, of good material and well made.

The Office Specialty Co., Toronto, make these desks in Quarter-sawed Oak and finished in any shade, from the very light to the dark, and as dark as Black Walnut.

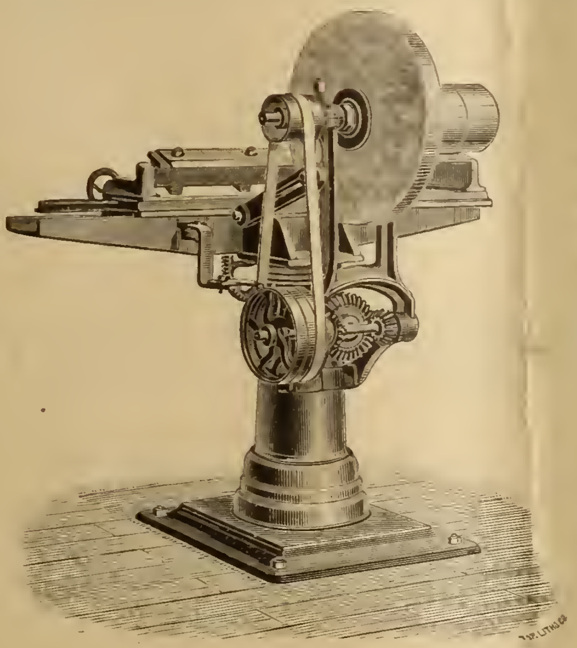
The planing machine was the work of Woodworth in 1828.

Church bells were first made by Paulinus, an Italian bishop, to drive away demons about 400 A.D.

For clinical work a Frenchman has devised an exceedingly delicate and quick-reading electrical thermometer, capable of showing a variation in temperature of 1-20th of a degree Centigrade.

AUTOMATIC KNIFE GRINDING MACHINE.

We here illustrate a machine for sharpening and setting cutting tools for planing machines, bookbinders' cutting machines, curriers' knives, long knives and power shears of all descriptions. This machine is constructed to carry an emery wheel variable in diameter from 24 to 8 inches, without any alteration to traverse belt of table. The emery wheel hangs in a swing frame which is held in position by two guide stays and can be instantly set for any size. These machines have been in successful operation, and everyone of them has met the expectation and requirements of the owner. It is practically an automatic machine and requires little or no attention whilst the knife is being ground. In the operation of the machine the knife is rigidly bolted to the carriage, and is moved to the emery wheel by means of adjusting screws. The machine is then set in motion, and by means of a pinion driven from the operating mechanism of the machine meeting with a rack on the carriage, the carriage is moved from end to end of the bed plate, and the knife bolted to it is carried clear of the emery wheel at each end of its travel, and by means of a belt shifter attached to the carriage, the travel of the carriage is reversed at the completion of each end of its stroke. By means of a machine of this kind, the knife will be uniformally set and ground with greater accuracy and in less time than by any other means at the present known. This machine is manufactured by Messrs. A. Schneider & Co., Pearl St., Toronto.



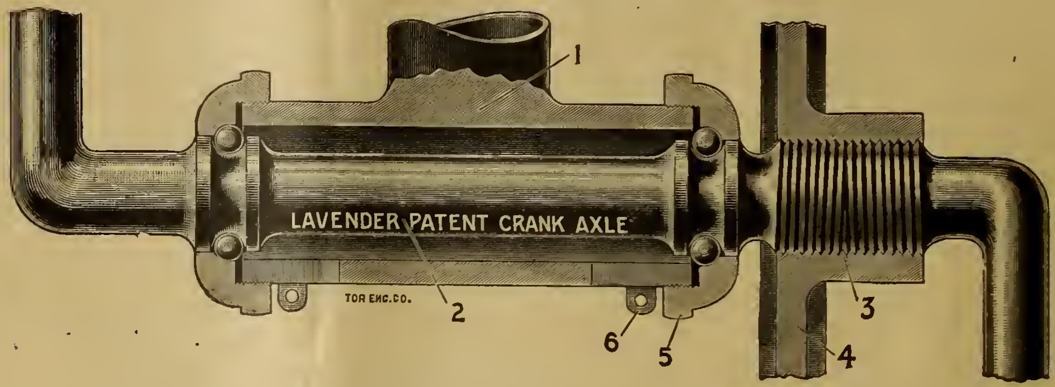
If only a few of the many schemes for the eliminating of smoke during combustion which are now being experimented will prove as efficacious as expected, the article a few years hence will be scarcely more than a tradition.

Electricity continues to dazzle the world with its wonderful achievements. Cucumbers and lettuce are now manufactured in large quantities, by the aid of electric lights, and raw spirit is converted in a minute, by an electric current, into 20-year old whiskey.

Manufacturers, as well as the public in general, are pleased to learn that the so-called coal trust is on the verge of dissolution. If ever a combination was conceived in iniquity it was this. The manner in which the public has been compelled by the monopoly to pay exorbitant prices for coal has been absolutely excuseless.

THE LAVENDER PATENT CRANK AND CRANK AXLE.

Figure 1 gives a sectional view showing a crank and axle complete attached to the frame. 1 refers to the crank axle bracket attached to the tubing, 2 refers to the axle passing through the said bracket and joined to the right hand crank within the hub 3 of the sprocket wheel 4 which is accomplished by means of a right and left hand thread. It will thus be seen that by starting the axle at each end of the hub and then running the sprocket wheel,the two ends of the axle are drawn firmly together and are prevented from turning out again by the square lug on one end fitting into the square socket on the other end of the axle (as shown in Fig. 2). Thus it will be seen that it is a very simple matter to remove the sprocket wheel and replace it by one of the different dimensions to change the gear when required 5 refers to the cap or adjusting sleeve which is held in place by a set screw in the lug 6. To adjust the bearing it is necessary to loosen the set screw in the lug 6 and allow of the sleeve 5 being turned to the right or left as required, and then retightening the set screw to securely hold the sleeve.



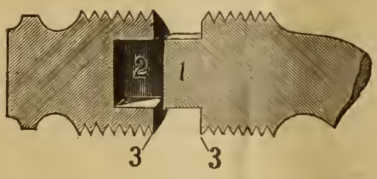


FIG. 2.

A NEW CLAIMANT FOR THE INVENTION OF THE ELECTRIC GLOW LAMP.

Electrical circles have been stirred from centre to circumference during the past month by the appearance, under somewhat sensational circumstances, of a new and hitherto unknown claimant for the honor of having invented the incandescent electric lamp. It will be remembered that the long and expensive litigation over the validity of Edison's patent was only lately decided in his favor against the rival Sawyer-Mann patents. The General Electric Company, which is the owner of the Edison patent, promptly proceeded to bring suit against a number of manufacturers engaged in the manufacture of glow lamps for infringement. The company was proceeding aggressively and successfully in having restraining orders and injunctions issued against such offenders, until near the close of January, when they struck a snag in the form of a defence of a new and startling character offered by one of the manufucturers whom they had summoned into court. This defence was neither more nor less than the allegation, backed by numerous affidavits and a number of exhibits, that one Henry Goebel, a German, who has been for many years a resident of New York, where he had followed the trade of a watchmaker, had himself invented, used and repeatedly exhibited in his shop, and in the streets of New York, previous to the year 1860, incandescent electric lamps, lighted by means of primary battery, and which, in every essential particular, in the use of a carbonized filament of vegetable fiber of high resistance, a vacuum chamber of glass, with leading-in wires of platinum and other metals, fully answers to the description of the Edison lamp of to-day.

Such prominent electrical experts as Frank L. Pope and Prof. Charles R. Cross, testify, after examination of the exhibits, that the lamps were undoubtedly identical with the Edison lamp in the essential features of employing a high resistance carbonized filament *in vacuo*.

That such important facts should have slumbered all these years, when they were apparently so accessible, and would have been in such demand in the great suit just won by the Edison interests, is one of the curious things that defy explanation. The outcome of this new turn in the litigation of the lamp question will be watched with intense interest. That the new matter is not esteemed to be dangerous to the Edison interests, is attested by the steadiness of the securities of the company, which, at the time of this writing, appear to have been unaffected by it.

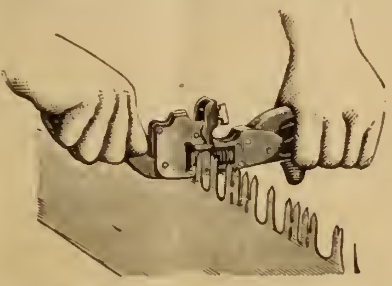
A glass factory in Liverpool, England, has glass journal boxes for all its machinery, a glass floor, glass shingles on the roof, and a glass smokestack 105 feet high built wholly of glass bricks, a foot square.

The Hamilton Steamboat Company's new wharf at the Beach will have to be rebuilt, as the ice smashed it completely. Most of the material was saved.

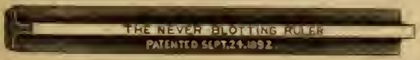
NEW PATENTS.

The Accompanying Illustrations are those of Patents recently issued to Canadian Inventors, and obtained through Mr. C. H. Riches.

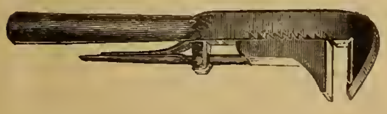
Patent No. 38348, granted to John McIntosh for improvements in saw sets. The device covered by this patent is for the purpose of setting the teeth of cross-cut or other saw without injury to the same. The invention consists of the device illustrated in this sketch.

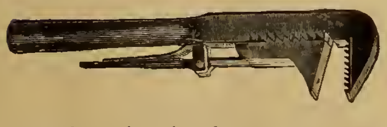


Patent No. 40486, granted to W. S. McKercher for improvement in rulers. The subject of this invention relates to a ruler for the use of accountants and others, and this ruler is so constructed that it can be readily shifted from point to point over the surface to be ruled, and is provided with a ruling edge which, under no circumstances, will come in contact with the ruled surface, thus preventing the ruled surface being smeared or otherwise disfigured. The ruler is comprised of a ruling edge bevelled in such a manner that the top of the ruling edge overhangs the bottom. This construction serves as a guide for the pen, and prevents the bottom or side of the pen coming in contact with the bottom of the ruling edge.



Patent No. 41676, granted to William Bill for improvement in wrenches. This invention relates to an improvement in wrenches so constructed that the jaws of the wrench can be interchanged, and the wrench converted at any time into a monkey wrench, a pipe wrench, or a stud wrench, in order that one wrench can be employed for any multiple number of purposes. The wrench consists essentially of a fixed jaw solid upon a shank which passes through or terminates in the handle; a lever pivotically connected to the shank, one end of which terminates in a rounded metallic bar, whilst the other end is adapted to be operated by the hand. On the rounded end of the lever is a sliding jaw, the inner face of which is serrated to engage with the corresponding serrated face of the shank. Within the shank is a longitudinal slot into which enters a guide pin secured to the sliding jaw for the purpose of holding the said jaw in its normal position.





ELECTRICITY IN CHEMICAL INDUSTRIES.

Most of the numerous and various applications of electricity are of such a nature that engineers and the reading public soon become familiar with them; but this is not always the case with new developments in electro-chemistry, as chemical processes, when not secret, are, as a rule, of less interest and of little importance to the public, says *The Electrical World*, except in so far as they result in the cheapening of a product. Many people, therefore, do not know the great and important progress which is being made in this field. The great cheapening in the price of pure aluminum and of the aluminum alloys, for instance, is largely due to electric processes. Electric bleaching is much more common than is generally supposed. Electric processes for extracting metals from ores are becoming of more importance every day, although comparatively little appears about them in current electrical literature. A cable dispatch just received from England announces the discovery of a new electric process for obtaining caustic soda, chlorine, and other commercial chemicals from salt water. It is stated to have been pronounced a great success by prominent chemists and to cost about half as much as the present methods. The dispatch gives no other details, and until it is verified and accompanied by further particulars little need be said about it here. That such processes are possible, however, is well known to all educated electricians, as they may be performed in any laboratory; it remained only to bridge the gap, which often is very wide, between the laboratory experiment and a cheap and practical chemical process. If these difficulties have been overcome, as the dispatch leads one to believe, and if such a saving is really effected, the result will doubtless be not only of importance to the manufacturing chemist, but also to other industries in which such important chemicals as caustic soda and chlorine are used. The oceans are practically inexhaustible mines of these products, which are and always will be free to the public; this "raw material" can never be taxed by any artificial protective tariff, and monopolies and trusts for raising the price of this raw material are forever beyond the control of politicians and legislation. A better source of supply could not be desired. It remains only for ingenuity and enterprise to develop processes for converting this free raw material into commercial products, which, if this report from England is reliable, appears to have been accomplished.

A NEW WHEEL HUB.

A new wheel hub has been lately invented in which an oil chamber is formed surrounding the bore of the hub, and a passage having a check valve is arranged to feed the oil from the oil chamber to the bore. A hub constructed on this principle can carry a six months' supply of oil, and the axle can be kept properly lubricated.

The Canadian party appointed to survey and locate the iuternatioual boundry line between Alaska anb British Columbia left Ottawa for Victoria, B.C.

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AND SCIENCE.

A REVIEW OF IMPORTANT RECENTLY PATENTED INVENTIONS

A Report of Judicial Decisions on Patent Law.

A GUIDE FOR MILLWRIGHTS, MACHINISTS, INVENTORS AND PATENTEES.

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During the year 1892, 22659 patents were granted by the United States Government.

The electric street railways are experiencing considerable difficulty in securing a suitable guard for the prevention of accidents.

INTRODUCTORY.

HAVING recognized for years past the necessity of a journal to meet the requirements of the engineering and inventive public, and having waited in vain for others to fill this need, we have come to the rescue and commenced the publication of this Journal. In presenting this issue we have endeavored to outline the proposed subject matter and policy of the journal, and our subscribers and supporters may rest assured that each subsequent issue will surpass the one immediately preceding it. It is our aim to bring before the Canadian mechanic a description of the latest improved machinery for manufacturing purposes, and it is also part of our aim to present to inventors, intending applicants for patents, and patentees, matters of importance transpiring around them in the patent world. To successfully accomplish our objects it is necessary that we should receive the support of the entire mechanical and inventive branches, and all subscriptions and advertisements addressed to us will be promptly attended to.

THE PATENT OFFICE.

It is rumored that the Commissioner of Patents has not placed his signature to any Canadian patents since February 28th, 1893. If such is the case it is to be deplored that such gross negligence on the part of an official at the head of one of the most important departments of the Government should be permitted to exist, and it is unquestionably the duty of the Government to investigate the case, and endeavor to provide a means for remedying this state of affairs. The Patent Office is one of the most important branches of the Government, as nearly all of our manufacturing industries are dependent upon the protection granted by patent rights, and if their interests are to be neglected in that respect the Patent Office might as well be abolished, and an expensive farce wiped off the Federal pay rolls.

AMENDMENT TO THE PATENT ACT.

A bill has lately passed the United States Senate making it compulsory for all railroads entering the United States to adopt an automatic car coupler before the year 1895. This is a move in the right direction by the United States Gouernment, but it is more than possible that the validity of the Act will be questioned, and a test case carried by the railroad companies to the United States Supreme Court, before they will submit to make such an extensive alteration in their rolling stock. It is to be hoped that the Canadian Parliament will pass a similar Act in regard to Canadian railroads.

The first iron wire was drawn at Nuremberg in 1351.

THE THREE-WIRE SYSTEM OF ELECTRIC DISTRIBUTION.

On Saturday last Mr. Justice Romer delivered judgment in the case of Hopkinson *versus* the St. James and Pall Mall Electric Lighting Company, Limited. The action was brought by Dr. John Hopkinson for the infringement of his patent, No. 3576 of 1882, as amended in June, 1891, for an invention of "improvements in distributing electricity, and in apparatus to be employed for that purpose." The use by the defendants of the system was not denied, the defence being mainly confined to the two pleas of anticipation by prior user, and want of invention. The general features of the three-wire system of electric distribution are so well known that a few words of description will suffice. Two dynamos are used coupled in series, with the positive terminal of the one connected to the negative terminal of the other. From each of the two outer terminals D and F a main is led into the net work, while a third main proceeds from the joined terminals, also into the network. Now, if each dynamo is designed to give a pressure of 100 volts, it will be seen that there will be a difference of potential between D and H, and between H and F, of 100 volts, and between D and F of 200 volts. As the mains C, G, and E are coupled to D, H, and F, there will likewise be a difference of potential of 100 volts between C and G, and between G and E, and of 200 volts between C and E. If the mains are kept at these differences of potential, incandescence lamps requiring a pressure of 100 volts can be employed between either set of mains C G or G E. If there be the same number of lamps on each system, there will be no current from the main G to the terminal H, for it is evident that the current that flows along C, and through the two groups K and M, finds its way back to the dynamos through the groups J and L and the main E, and that there is none available to return by the main G. But if one group be extinguished (say L), then the group J will only furnish a passage for half the current from the groups K and M, and the other half must return by the main G. Similarly, if it be the group K that is extinguished, then the necessary current for J must come by the conductor G, which always carries an amount of current corresponding to the difference of load on the two parts of the system. In an extended network in a town there should not be any great difference in the two sides of the system, and hence the current in the third or centre wire should always be small. The advantages of the three-wire system over the two wire are that the electric current can be delivered at double the pressure and with half the quantity. If the area of conduction be determined according to Lord Kelvin's law, the two outer mains need be only half the weight, while the centre main may be much less than half the weight of each main in a two-wire system. Practically this saving is often exceeded, owing to the size of conductors being increased from that given by the law in order to limit the variation of pressure permissible. The Edison Company claim that the saving in copper is about 60 per cent.

At the date of Dr. Hopkinson's patent the ordinary parallel two-wire system of electric distribution was, of course, well known, and in addition there was a series parallel system, in which each parallel contained two or more lamps. Here the difference of potential between the mains C and E is sufficient to feed two lamps in series, while the main G serves to equalize the pressure of each group. But if some of the lamps in one group should be turned out, then evidently the remainder would burn more brightly, since they must afford a passage for the current for the entire group opposite. Hence there would be a constant fluctuation, lamps going up and down in brilliancy as adjacent householders altered their lighting. In extreme cases the lamps in one group might be so few, as compared with the lamps in the other group, as to be burned down with excess of current. In that case the entire network would be put into darkness. Further, it was known that groups of arc lamps in series could be furnished with a return wire which took the difference of current required by the two groups. Messrs. Siemens Brothers had supplied several alternate, current machines constructed to admit of this. All the bobbins in the machine were arranged in series between the X and — terminals at the top. But a connection was also brought out to a terminal at H. When the full number of lamps were burning the conductor G only served to protect the one group from the effect of fluctuations in the other group, and it was often dispensed with. Its use was to allow the whole of one group to be extinguished without greatly interfering with the other group.

It was one of the aims of the defendants to show that the invention included this arrangement, in which case. of course, the patent would have been invalid. The specification did not refer specifically to paralled distribution, and it was argued that it therefore included series distribution. On the other side it was pointed out that the form of distribution was stated again and again to be one at constant potential, and that neither in 1882, nor now, would any one dream of using an extended arc lighting plant otherwise than in series. We have not the space to follow the evidence on this point, but will quote a part of the summing up to show the effect it had on the mind of the judge:

> "Now, it is true that throughout the patentee does not use the term parallel to define the system he is dealing with. I believe this to be because he preferred to use the appropriate scientific terms to describe the system rather than the popular terms. But, in my opinion, when the specification is read with care and fairness, and well understood, it is clear that the patentee is thereby confining his claim to the paralled system. He shows throughout that he is dealing only with a system in which the potential is to be kept constant at the places where the electricity is to be supplied, and in which the current varies as more electricity is required to be used on the different wires that tap the main conductor—that is to say, that he is dealing only with the parallel system, for, on the balance of evidence, it is clear that the characteristics I have named denote the parallel system, and only that system. At the commencement of the specification (page 3 of the print, lines 7 to 10), where he refers in general terms to his invention, he shows that the system he is dealing with is one where the electro-motive force is supplied at a fixed potential. Now, that is a phrase well known to electricians. Moreover, I think that the words 'such conductors,' at line 9, mean 'conductors for an electric supply at a fixed potential.' It is possible however, that the words may mean merely 'conductors for an electric supply,' and I therefore pass on, only observing that the sentences immediately following (and in particular the phrases on lines 12 to 17 and 24 to 25) appear to me to support the view I had taken as to the meaning of the words 'such conductors,' in line 9. Then, at lines 9 and 10 and 31 to 38, the patentee describes what his invention is and its

special advantages, substantially as previously pointed out by me in this judgment. At lines 9 and 31 he shows that one of the advantages is economising the cost of the main conductors, and I may add that the very expression 'main conductors' implies branch conductors, which do not really exist except on the parallel system."

After the trial commenced, however, the defendants obtained evidence of the existence in Glasgow, prior to the date of the patent, of a parallel distribution system arranged on the three-wire system. They obtained leave to bring this forward, and put into the box Mr. J. D. F. Andrews, who deposed to using a Siemens alternate-current machine of the kind already referred to, according to the method set forth in a sketch which he had prepared. It will be seen that three mains proceeded from the alternator, and were distributed through the workshop, lamps for lighting being arranged on both sides of the system, as well as lamps that were being run on the pumps, and lamps undergoing the flashing test. This was such a very serious piece of evidence that the plaintiff obtained an extended adjournment for consultation and inquiry. When the court reassembled, Mr. Andrews was severely cross-examined, and admitted that he had applied to Dr. Hopkinson for a license under the very patent under trial. Other evidence was brought to show that the machine was altered after it left the makers to put the halves in parallel instead of in series, and grave doubt was cast on the accuracy of the sketch. On this point the judge said:

"Now, if the defendants' case as to Sauchiehall (Glasgow) had not broken down, an anticipation would have been established. But on the whole evidence as to this I am satisfied there was no anticipation, and that the installation at Sauchiehall was not the plaintiff's three-wire system at all, but at most merely a case of the ordinary multiple parallel, where the middle wire is not connected with the dynamos. There were two witnesses for the defendants (Andrews and Town), whose testimony, if it could have been accepted, would have established that the third wire was connected with the dynamos. Sir Horace Davey in his summing up referred also to a witness, McKillop, but in justice to that witness I am bound to say that, taking his evidence as a whole, he did not purport to say from his own knowledge that the third wire was connected with the dynamos. Now as to Andrews and Town I am sorry to be obliged to say that I cannot give credit to their testimony on the point. This Sauchiehall case broke down, and may be dismissed from further consideration."

The evidence on this point was a conflict of recollections, and naturally the judge gave the plaintiff the benefit of the doubt. To invalidate a most useful and valuable patent on the strength of a half-forgotten arrangement, put up in an unsuccessful experimental workshop in Glasgow more than ten years ago, would have been a serious matter, even if there had been no rebutting evidence; but when the principal witness was flatly contradicted by others, the course of justice was clear. It is probable that Mr. Andrews failed to distinguish between what he had done at a certain date and what he would do now in the light of his present knowledge.

There were two other alleged anticipations—at the Alexandra Palace and at Inchicore. The judge ruled that the Alexandra Palace installation was not a case of the parallel system at all. Two dynamos were coupled; a conductor was led from each to an arc lamp, and a single conductor served as a common return from both lamps to the joined poles of both dynamos. When both lamps were burning they were burnt in series on one main conductor, and the whole electric current went along the main conductor through the two lamps, and for all practical purposes no electricity passed down the return or central wire. When one lamp only was burned, the central wire operated as part of the main conductor, and the electric current went along this one conductor only, through the lamp back to the dynamos. Instead of there being four main conductors to burn two lamps, there were three only. For all substantial purposes the central wire took part of the whole current or none. In regard to this the judge said:

"The practical advantages of the plaintiff's invention were not, or were certainly not all, obtained in this installation. And I think it is not a fair objection to the novelty of a process, which is intended to be and which is of great use when applied to a system comprising many things, to say that the case of one has not been expressly excluded by the inventor, and that as the application of the process to the case of the one, so far as it could be applied to the one was known, therefore the process had been anticipated, though the utility of the invention practically disappears when the case of the one is considered. If such an objection were allowed there could never be a valid patent for many important discoveries, as for instance, for many discoveries in connection with multiple telegraphy. Then as to the Inchicore case, that in principle is not distinguishable from and does not go beyond the Alexandra Palace case. The only difference is that instead of one lamp on each side of the central wire there were several lamps. But the lamps were in series—the same number on each side—and, as before, either all the lamps were burnt in series on a main conductor, in which case substantially no current passed down the central wire, —or one set of lamps was burnt in series, in which case the central wire became part of the main conductor, and substantially all the current flowed down it. In this case, as in the Alexandra Palace case, one of the essentials of the plaintiff's system was absent—namely, the joining of the middle points of the bridges or parallels to one another. All the remarks I have made with regard to the Alexandra Palace case in fact apply to this, and I need not repeat them. It follows that the alleged anticipations fail."

The case of anticipation having been disposed of, there remained the plea of want of invention. It was argued that the arrangement having been carried out at the Alexandra Palace for one lamp on each side of the system, it did not require any skill or inventive power to put several lamps on each side. With all the facts before one there seems a great deal of force in this objection, and yet experience tells us that people of ability will have a ready way out of a difficulty staring them in the face, burning them, as the children say in "Hunt-the-thimble," and yet for weeks and months they will fail to recognise it. All the facts may be known, and yet their significance is not recognised until it is specifically pointed out. The plaintiffs were able to point out that Edison had invented the same system in America immediately after Dr. Hopkinson did so here, and that Professor Silvanus Thompson, one of the defendant's witnesses, had prepared, about the date of the patent, a diagram showing all the principal and newest systems of lighting which were known or occurred to him, and yet it never occurred to him to suggest a system like the plaintiff's. The judge took the common-sense view that it requires thought and experiment to find what many men have looked for unsuccessfully, even if eventually it proves to be full open to the public gaze.

The patent was also attacked on one or two minor points, but we need not do more than note them. It was said that a voltmeter, which was described in the specification, would not work, and that there was insufficient description to enable a workman to employ two alternate-current dynamos with the three-wire system. Both these points were overruled.

Although the action was brought in the name of the inventor, Dr. John Hopkinson, the patent is now the property of the Westinghouse Electric Company, who were the real plaintiffs. At the close of the case they agreed to the suspension of the injunction for six months as a concession and out of regard to the great public inconvenience that would have been caused by a summary stop being put on the electric lighting of the St. James's district. The St. James's Company have, however, to continue the account of profits which the judgment has awarded the plaintiff during the suspensory period.

It will be interesting to know in what position the supply companies stand who use the modified three-wire system. This does not appear to come within the clearly-restricted provisions of Dr. Hopkinson's second claim, which reads: "Second. In a system of electrical distribution or supply, the employment of three (or more) conductors in combination with two (or more) dynamo machines in series substantially as hereinbefore described with reference to Fig. 5 of the accompanying drawings, whether the middle conductor be continuous or be replaced by an earth return, as set forth." Whether it will be possible to apply the doctrine of mechanical equivalents to embrace the system shown in the sketch is a question for legal determination, but if not, the Westinghouse victory is likely to be shorn of a good deal of its value.

STEAM ENGINE LUBRICATOR.

The necessity or great advantage of having the interior of an engine cylinder and steam chest lubricated, is well known. It greatly reduces friction and wear, and prevents rust when the engine is temporarily inactive. Strange to say, no adequate means has heretofore been devised to steadily effect this operation. The advent, therefore, of a meritorious device can well be welcomed by engineers of all classes and departments, as it provides for an economical and steady influx of oil directly into the live steam pipe leading to the cylinder. This lubricator consists of a steam pipe provided with an upper and a lower branch, between which are interposed and connected the oil reservoir of cylindrical form. A sight tube is also provided, indicating at all times the stage of the oil supply. The oil cylinder is surrounded with a jacket, and the annular space is also in communication with the live steam and keeps the lubricant in a thoroughly liquid state, even if it be tallow. It will also be understood that the steam pressure above and below is balanced, and the oil is practically as free as in open air. The outlet, or rather the inlet to the steam pipe is regulated by a valve, and the lubricant passes out in occasional drops, which are taken up and thoroughly diffused by the steam over the entire working surface. This is the most valuable working device in its line that has yet been devised, and it would seem that no further improvement is needed.

INVENTOR TRAPS.

No doubt many of our readers have acquired within a year or two the great and glorious title of "Honorary Member of the Parisian Inventors' Academy." One of the editors of this paper received, a short time since, a notice of his election to that exalted position, and was informed at the same time that by sending on the small sum of $10 he would receive a diploma and a "great gold medal."

The miserable style in which the printed matter of this concern is gotten up, and the fact that the circular letter is not addressed by name, and does not specify any particular invention, but is gotten up in such general terms as to apply equally well to the case of any patentee whose name and address may appear in the *Patent Office Record*, ought, it seems, to prevent any intelligent person from being caught by the latest humbug, but it seems the "Academy" is able to do some business. Of course there is a pretense of examination of inventions, etc., but it is all so palpably humbug that we hope none of our readers who have been "elected" (a passive and unavoidable act) have been so foolish as to send $10—an active and avoidable exhibition of gullibility.

There are many traps laid for those whose addresses appear in the *Patent Office Record*, and a luckless inventor is immediately flooded with propositions of all kinds, nine-tenths, if not all the stuff being pure and unadulterated humbug. It is a safe rule never to pay out any money nor sign any paper without *knowing* just what you are to receive for your money, or what the purport of your signature may be.

ELECTRO-MAGNETISM.

The measurement of the intensity of an electro-magnetic field is a matter of great practical difficulty. However, as the movement of a wire in any magnetic field tends to set up a current in the wire, and as the field may be that of a permanent magnet, or even that of the earth, and since, also, the strength of any field is proportional to the number of its lines of force per unit area, while the current generated in a wire is also proportional to the number of lines of force cut by it, and to the rate of cutting, we may compare the strength of different fields by observing the current resulting from the cutting of them by a wire at equal speeds. It is advantageous to wind the wire into a small coil and place it in the field with its plane perpendicular to the direction of the lines of force, and then suddenly turn it through a right angle, when its plane will be parallel to the lines of force, and none will be passing through the coil. The E. M. F. resulting will be proportional to the number of convolutions, the strength of the field and the area of the coil (that is, to the number of lines of force passing through the coil), and to the speed with which the lines are removed. Special galvanometers are constructed to give the values of such sudden momentary currents, by comparing which the strengths of the various fields can be measured.—*Electrical Age.*

COMMENTS ON THE PATENT SYSTEM.

It has become quite a common practice for certain persons to find fault with the present patent system. Some individuals would like to have a patent granted for anything to anybody who would make application for it, and pay the requisite fee, while others would like to have the government stand back of and guarantee the validity of every patent issued. Between these two extremes there is every shade of opinion, and between them undoubtedly lies the true ground.

Much of the opinion adverse to the present condition of things is due either to an ignorance as to what now exists, or a desire to have things different for some personal reasons. It is quite true that many things relating to our patent system could be changed to advantage, but it is equally true that these changes should come in the shape of improvement on what we have, rather than the substitution of something totally different.

It has been said that the possession of a patent simply gives the owner the right to sue and be sued. While this is somewhat of a pessimistic view of the matter, a patent at the present day at least gives this much, if it does not give any more. Under a system similar to that prevailing in most foreign countries, where a patent is granted to any one applying for it, a patent would hardly give this right. It would simply be an evidence that some individual had represented himself to be the inventor of such and such a device. As every one has at some time met the self-styled inventor who is always going to get a patent, and have the world by the tail, but who never does, it is not difficult to imagine what would be the condition of things if all of these individuals could get patents as easily as this free-for-all patent system would make it. This kind of patent system would very largely increase the business of the patent attorneys, and it is, therefore, not surprising that some of its advocates are found in that class. The increase in the attorney business would not so much be due to increased number of applications as it would to the fact that inventors and purchasers of patents would have to employ attorneys to look into the scope and validity of every patent which made any pretensions to be anything.

Examination into the question as to whether or not a certain device is a new and useful invention, is the real meat of the whole matter, and one which it is well to carefully consider. Any decision on this matter, whether it comes from an attorney, the Patent Office, or the courts, is in reality the expression of individual opinion, and that opinion is sure to be influenced more or less by the extent of the examination and the bias of the individual making it. Therefore, if the person making or owning an alleged invention really wants to know whether the thing is new or not, it is of prime importance to him to have that examination as thorough as possible, and also have it made by some one who has no personal interest in the nature of the decision.

Any investigation into the merits of an invention must be limited by the facilities for examination, and the time consumed, and any attorney who makes an examination comprehensive enough to be of any value must necessarily charge a large fee. Under the present patent system the applicant may, if his attorney does his business properly, compel the Patent Office to make this examination in a thorough manner, for the amount of the good fee. The facilities for examinations of this kind by the patent officials is superior to that at the command of any attorney, and while not all of the examinations, nor even the majority of them, are comprehensive, the power is within the applicant to make it equal or superior to one that an attorney would charge from five hundred to a thousand dollars for.

This much may be said for the present patent system as against the free to-anybody system advocated by some, and it is not unreasonable to propose that the person who is expecting to spend his own money on some given device would like to have as much assurance as possible that he is not wasting it. This consideration doubtless gives rise to the wish that the government would guarantee and protect every patent issued. Without going into the reasons why this would be impracticable, it will be sufficient to point out that it could not but produce injustice to many. For example, suppose John Smith patents a device that Tom Brown has been making for some time. As Smith would have a guaranteed patent, Brown would be helpless, and would have to abandon or pay royalty for that which he himself was the original inventor. It is true that the government might issue a patent, and then guarantee it after a certain time, but this would compel the government to take an indefinite amount of testimony from all sorts of individuals at all sorts of places, and this would put the cost of a patent out of the reach of any but the wealthy.

The present system offers a good many opportunities for the applicant to take advantage of his own benefit, if he knows how, as the compelling the office to make the comprehensive examination before referred to. In some cases, applicants, and especially rich corporations, not only take these advantages, but actually abuse the privileges that are permitted. Most inventors, and particularly those who are making their first applications, are anxious to get their patents issued as quickly as possible. The old hands at the business take exactly the opposite course, and delay the issue as long as possible, well knowing that the life of the patent extends eighteen years beyond the day of issue. As an example, a patent was recently issued after lying in the office for fourteen years, and the owners have consequently secured protection for a term of thirty-one years. This is manifestly an abuse of privilege, and a circumstance that is at variance with the spirit, if not the letter of the law.

Various remedies have been suggested for this state of things, but as far as I am aware, they all relate to some means for expediting the patent through the office. While this would doubtless cure the evil, it is likely to work injustice to many innocent parties, for applications often get unexpectedly tied up in interferences. A much better plan would be to add a clause to the law, providing that the life of no patent should extend to a date more than twenty years subsequent to the day of first filing in the Patent office. This would give every applicant all of the time he wanted in which to obtain a patent, while at the same time there would be no object in needlessly delaying the issue.

DIVERSIFIED AGRICULTURE.

An economic derangement of some kind in agricultural pursuits is apparent when there is an excessive production of certain commodities, like wheat and cotion, while simultaneously there is a dearth of other important staples, such as hog products, horned cattle and sheep, conditions which we experience in this country at the present time. This irregularity in the relations between supply and demand is attended with an abnormal depression of prices for the one class of products, corresponding wite their abundance, and high prices for the other, governed by the degree of scarcity. Both the domestic and export trade are injuriously affected by such a dislocatiou. On the Produce Exchange the record is made almost on the same day that wheat is selling lower than ever before and that hog products are high beyond precedent. The calculation was lately made that the average of daily quotatiods for wheat, actual sales in New York, "was che lowest ever recorded in any month during the 67 years of which quotations have been regularly compiled." And as to provisions, it was stated in the market reports for last Saturday that not at any time since the war has the price of hogs been as at present—that the country is being ransacked for stock, and everything having the shape of a hog, no consideration being given to age or quality, is now on the market at sellers' prices. Beef and mutton likewise feel the upward tendency and sell at much higher prices than a year ago.

Cotton is another staple that is going through a crucial period, prices having touched a point where there was said to be no profit for the planter, but the market is now believed to be recovering, as the result of a co-operative movement in all the cotton States to restrict production. Cotton planters, like the Western farmers, have been compelled to precipitate their product on the lowest market ever known.

Although farmers not long ago claimed that there was no profit in growing "dollar wheat," they have since the last crop, been comyelled to content themselves with receiving only from 50 to 60 cents per bushel, according to location.

The St. Paul *Pioneer Press* surveys the situation with reference to wheat, concluding that it is "through diversified farming" that a remedy can be found for unremunerative prices, and the same remark will apply to the whole field of agricultural enterprise. The writer says:

"The plain fact is that there is over-production of wheat. There is more wheat raised in the world than can be marketed, under ordinary conditions, at a price sufficient to give the grower a reasonable compensation for his work. This is the natural consequence of an unprecedented development of the wheat-growing area in the United States. Under the stimulus of cheap lands and low transportation rates the wheat product of this country has increased faster than the world's dəmand, so that there is a steady surplus."

The visible supply lately accumulated to the before unheard-of quantity of 81,000,000 bushels as a consequence of favorable weather for sending the crop to market and because of the large quantities of old grain held over from the harvest of 1891. Although the turhing point was anxiously watched when the flood of grain would begin to recede, elevators everywhere were reported to be full and all side tracks covered with cars.

Therefore farmers are exhorted to "escape from the thralldom of a single-crop idea." The great Northwest, farmers are told, must develop the dairying interest, and devote a larger share of attention to the raising of live stock, to sheep husbandry and hogs. In this last particular there is practically no limit to the field of remunerative enterprise, for, as we are reminded on the best Western authority, this business does not require the abandonment of other farm interests or any especial changes in the farmers' programme. Moreover, aside from a vast home consumption, all foreign countries are now open markets for American hog products.

Secretary Rusk in a recent report expressly points out the necessity for a diversification of crops throughout the country and for a close study of all markets abroad, so that our agricultural products shall be adapted to special demands. The inhabitable globe is now more than ever a unit, as facilities increase for cheap and rapid transportation to every part, and in the arts of agricultnre means must be adapted to a specific end.

AN INVENTOR WHO HAS SECURED A LARGE FORTUNE.

Mr. J. A. Grignard, who for several years has been employed as lithographer in the Department of the Interior at Ottawa, left to-day for New York. He has resigned his position in the Civil Service. He goes to New York on business in connection with a new lithographic process which he has invented, by which as many as 18 tints can be printed at one impression. He was offered $100,000 for his patent by some Ottawa capitalists several months ago. He has disposed of it to a company in New York, which has paid him half a million dollars for his process—$200,000 down and the remainder later. Over and above that he is to receive 2 per cent. of the profits of the company from the process. He is also under contract to devote the next two years to further experiment with a view to further inventions and improvements in lithographic processes, which, if any, are to become the property of the company. For those two years he will receive a salary of $1,000 per month. Mr. Grignard is a native of Paris, France. He is 45 years of age and married. He takes his great good fortune very quietly.

At the time of going to print a suit,—Carter Co. vs. Anglo American Novelty Co.—in which the plaintiffs are suing the defendants for the infringement of their patent, 14182, is being tried before the Exchequer Court.

The British Admiralty has definitely adopted a wire quick-fire 6 inch gun, weighing seven tons, and which sends an elongated shot of 100 pounds weight for a distance of four miles so rapidly that there are four shots in the air at once. Forty of these guns are about ready for British warships

PATENT FOR SALE.

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A CANADIAN FIRM TO MANUFACTURE ON ROYALTY

A FRYING PAN which Carries off all Smoke and Smell

Arising while cooking—carries it into the stove and up the flue.

PATENT GRANTED APRIL 9TH, 1892.

Address, Box 19—

The Engineer and Inventor Publishing Co.

U.S. CIRCUIT COURT, EASTERN DISTRICT OF PENNSYLVANIA.

Ex Parte Moses

Decided December 27th, 1892.

Witness, Subpœna Duces Tecum, Authority of Clerk, Patent Office Interference Pooceedings.

Sec. 4906, Revised Statutes, providing that, on the application of any party to a contested case pending in the Patent Office, the clerk of any Federal Court shall issue a subpœna for a witness, commanding him "to appear and testify," does not include an authority to issue a subpœna *duces tecum*.

STATEMENT OF THE CASE.

Rule to show why an attachment should not issue against George Stuart for contempt in refusing to produce certain letters in obedience to a subpœna *duces tecum* issued by the clerk in an interference proceeding pending in the Patent Office.

The subpœna was issued under section 4906, Revised Statutes, which reads as follows:

Sec. 4906: "The Clerk of any Court of the United States for any district or territory wherein testimony is to be taken, for use in any contested case pending in the Patent Office, shall, upon the application of any party thereto, or of his agent or attorney, issue a subpœna for any witness residing or being within such district or territory, commanding him to appear and testify before any officer in such district or territory authorized to take depositions and affidavits, at any time and place in the subpœna stated; but no witness shall be required to attend at any place more than forty miles from the place where the subpœna is served upon him.

A new reversing gear has recently been patented, in which a single eccentric rod is employed to perform the work heretofore accomplished by the two reversing rods.

DECISION OF THE U. S. COURTS.

Supreme Court of the United States—Lowell Manufacturing Company, Limited, v. Caro, et al.

Decided March 6th, 1893.

Patent —— Process of tempering springs, double use.

Letters, patent No. 116,266, to Alanson Cary, June 27th, 1871, for an improvement in modes of tempering springs, which consists in subjecting the spring to a temperature of 600 degrees, held, in view of the prior development of the same principle in the manufacture of wire bells for clocks, and of hair balance springs, to be invalid on the ground of double use.

2. BETTER RESULT OR WIDER RANGE OF USE.—The public cannot be deprived of an old process because some one has discovered that it is capable of producing a better result, or has a wider range of use than was before known. (Citing Smith v. Nichols, 21 Wall., 112; Roberts v. Rye, 91 U.S., 150; Hollister v. Benedict Mnfg. Co., 113 U.S., 59.)

3. DOUBLE OR ANALOGOUS USE.—It is not patentable invention to apply old and well-known devices and processes to new uses in other and analogous arts.

Of the reciprocity treaties negotiated with the countries in this hemisphere, those with the Spanish West Indies (Cuba included) and Brazil are so far productive of excellent results. A study of the exports shows large increases. Despite the reported rumors of a desire to nullify the treaty with the Spanish West Indies, the opinion of a large and conservative export house in New York is that, barring the reimposing of a duty on raw sugar, nothing of the kind is likely to happen.

PATENTS ISSUED WEEK ENDING MARCH 22ND, 1893.

No.	DATE.	TITLE.	NAME.
42300	March 16, 1893	Oil Can Casing	S. J. Schooley and Bessy McDonald.
42301	" "	Dental Chairs	A. P. Gould.
42302	" "	Surface Cattle Guard	Geo. W. Miller.
42303	" "	Mode of making Compound Metal Tubes	Geo. W. Everson.
42304	" "	Heel Nailing Machine	H. A. Webster.
42305	" "	Method of and Apparatus for regulating temperatures in Ships, Buildings, etc	Alex. Shields.
42306	" "	Wire Stretchers	J. S. Richardson.
42307	" "	Mechanical Motion for Pumping Machine	Robt. Martin, Sr., and D. Martin.
42308	" "	Washing Machine	L. J. Wilson.
42309	" "	Harvester Elevators	M. Kane.
42310	" "	Neck Yoke attaching device for Vehicle Poles	Jas. L. Cox.
42311	" "	Machine for tightening	Jno. W. Rickers.
42312	" "	Wire Stretchers	L. W. Stokely and S. T. Carnes.
42313	" "	Cash Registering and Indicating Machine	Boston Cash Register Co.
42314	" "	Steam Engines	J. M. Powell and A. Duncan.
42315	" "	Bits for Wood Working Machines	Edwin Gollins.
42316	" "	Vertical Boilers	Chas. F. Baker.
42317	" "	Means of transferring cars from floating vessels	Robt. T. Rever.
42318	" "	Process and Apparatus for impregnating beer with carbonic acid	Universal Carbonating Co.
42319	" "	Electric Metal Heating Machines	Electrical Forging Co.
42320	" "	Grates for Ranges and Stoves	Wm. W. Culver.
42321	" 18 "	Mariners' Compasses or Apparatus for recording the course of ships	A. H. Wrigley (as executor) and Jno. Hope.
42322	" "	Cleaners for Disk Harrows	C. Merrick.
42323	" "	Flooring and other lumber	F. J. Feldmann.
42324	" "	Organs	C. S. Haskell and Wm. E. Haskell.
42325	" "	Disk Harrows	S. W. Woodlawn.
42326	" "	Oilers for axles and wheels	H. Coulston.
42327	" "	Apparatus for raising and lowering Incandescent Electric Lamps	Wm. J. Kidd (Lawyer).
42328	" "	Bidets or Hip Baths	Rosa Gosden.
42329	" "	Measures for measuring and indicating series of lengths	F. Boas and S. Weinnann.
42330	" "	Thill Tug	A. C. Marshall.
42331	" "	Process of manufacturing compound and elementary bodies or chemical products by means of electricity and appliances therefor	H. Uiewerth.
42332	" "	Automatic Liquid Gauges	Geo. A. Lewis.
42333	" "	Electric Motor Switch	E. W. Rice, Jr.
42334	" "	Eleetric Locomotives	U. C. Bassett.
42335	" "	Foot Rasps for Horses	G. Tompkins.
42336	" "	Beating Engines for pulping fibrous materials used in Manufacturing of Paper	Jas. Taylor.
42337	" "	Trunks, Knapsacks, Valises, etc	A. W. M. Keen.
42338	" "	Process of obtaining Bromine from natural brine	H. H. Dow.
42339	" "	Cates	E. A. Casper.
42340	" "	Mail Cancelling and Post Marking Machines	W. R. Landfear.
42341	" 20 "	Ghurns	R. Z. Curtis.
42342	" "	Cash Registering and Indicating Machines	J. J. Webster.
42343	" "	Horse Shoe Bending Machines	Jno. Wike and the Standard Horse Shoe Co.
42344	" "	Apparatus for Drilling Wells	S. MacEachern and Thos J. Foster.
42345	" "	Fire Motor	Jos. Silverwood.
42346	" "	Furnace Grates	Wm. S. Dobbs.
42347	" "	Clothes Pins	J. B. Lockwood.
42348	" "	Car Coupling attachments	O. Wynn.
42349	" "	Thill Couplings	W. B. Root.
42350	" "	Bottlers	A. L. Straus.
42351	" "	Printing Telegraphs	D. H. Bates and H. Van Holvenbergh.
42352	" "	Blowers and Smoke Consumers	M. R. Ruble.
42353	" "	Hydrocarbon Burners	E. G. Mummery.
42354	" "	Construction of Window Sashes to facilitate cleaning, etc.	F. de J. Clere.
42355	" 21 "	Pipe Thimbles	Jas. Smith.
42356	" "	Fire Escapes	Richard Howell and A. C. Ball.
42357	" "	Gravity and Cut off Grain Cleaners and Graders	D. J. Davidson, A. S. Martin and S. Martin.
42358	" "	Harvesters	Wm. McCloskey and A. J. Green.
42359	" "	Wire attaching device	Firm of R. L. F. Strathy & Co.
42360	" "	Dynamo Electric Machines	Robt. Mundell and E. H. Johnson.
42361	" "	Electrical Transmission of Power	H. W. Leonard.
42362	" "	Wrenches	T. Fletcher.
42363	" "	Brushes	C. Smith.
42364	" "	Interlocking apparatus for Railway Signalling	S. T. Dutton.
42365	" "	Cash Registering and Indicating Machines	Boston Cash Register Co.
42366	" "	Cash Registering Machines	" " " "
42367	" "	Jump Seat or convertible Vehicles	Chas. N. Stratton.
42368	" "	Machine for making Felt	P. Legrand.
42369	" "	Safety Shoe and Brake Applying Attachments to Car Trucks	R. J. Spearing.
42370	" 22 "	Tubular Pneumatic Action for Organs	Farrand and Votey Organ Co.
42371	" "	Seeding Machines	Peter Hamilton Mfg. Co.
42372	" "	Saddles for Velocipedes	Chas. F. Lavender and Thos. Fane.
42373	" "	Bicycles	Chas. T. Howell and Wm. C. Ashdown.
42374	" "	Horse Shoe	Owen McQuillen and Wm. A. Verner.

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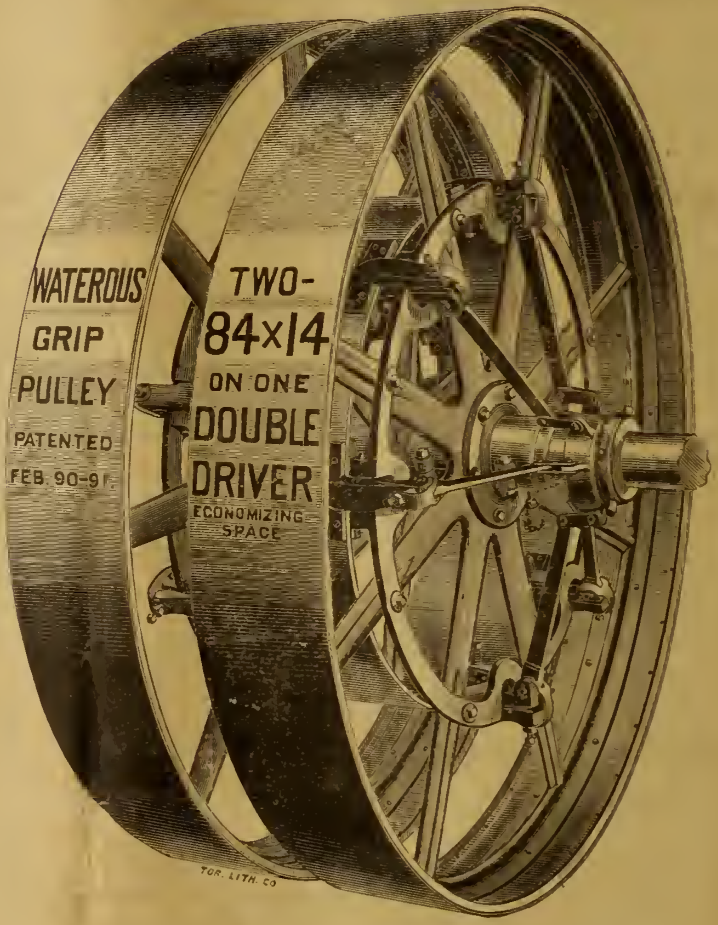

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